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ABSTRACT

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THE INFLUENCE OF IMMEDIATE FEEDBACK ON THE BEHAVIOR OF TEACHERS-IN-TRAINING

September 10, 1972

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Office of Education
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Abstract

The present study was an attempt to determine whether the behavior of teachers-in-training could be modified by providing them with immediate feedback as to their classroom performance. Two groups of undergraduate teaching interns were outfitted with wireless FM receivers. One group was given praise (by an observer fitted with a wireless microphone) whenever they emitted any of a predetermined set of positive behaviors. The second group received no feedback. The results showed that the technique was effective mainly when positive verbal comments on the part of the intern were reinforced. In the experimental group, the rate of this behavior rose dramatically in the training sessions. In addition, during the training phase, interns in the experimental group punished much less than the control subjects. It was concluded that the method tested was inexpensive and highly efficient for modifying some behaviors.

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Problem and Objectives

The purpose of this project was to test a method for providing student teachers with immediate feedback about their classroom performance in the context of the classroom itself.

Ammons (1954) indicated that feedback is one of the most dependable and thoroughly tested principles in modern psychology. The term "feedback" refers to the knowledge that the learner receives relative to the quality, quantity or other aspects of his performance. In a very early study of the effects of feedback upon learning, Hurlock (1924) administered intelligence tests to three groups of children. Immediately following the test, one group was told that they did very well, one was told that they did poorly and the third group was told nothing. When tested later on an alternate form of the test, the two experimental groups performed better than the group which received no feedback. Page (1958) gave objective tests to over 2000 junior and senior high school students. Students whose papers had positive comments about their performance did better on later exams than those whose papers simply contained a numeric grade.

Not only is the fact of feedback important, but so is its placement in time relative to performance. Greenspoon and Foreman (1956), for example, found that the more immediate the feedback the greater (in terms of quantity) and faster the learning that took place. These findings are consistent throughout the literature. One of the more important features of teaching machines is based upon these findings. Teaching machines provide for immediate feedback. There is virtually no lapsed time between the student's response and the machine's confirmation or rejection of that response.

Usually, in traditional internship programs the student is observed by his faculty advisor(s) or supervising teacher(s) who may or may not attempt to record the highlights of the intern's activity. It is several days, in any case, before the student and advisor can get together to discuss the student's performance. By this time, much of what transpired in the classroom has been forgotten, distorted or only partially remembered. What is greatly needed is some method by which the teacher in training can receive immediate information as to her performance in the classroom. To do this student interns were fitted with FM receivers and trained observers had control of an FM wireless microphone. The observer was then able to immediately inform the teacher as to whether what he (she) had just done was "good". The behavior of the teacher interns that were examined were their responses to the children's behavior.

On a small scale, Kimmel and Silverman (1972) have, using the above mentioned apparatus, increased by five times the number of positive comments by student teachers to their elementary school students. These comments include things like "good," "look how well (name) is working," and "you certainly turned in a fine paper today (name)." In other words, positive feedback to the children in the classroom was increased by providing immediate and positive feedback to the teacher-in-training. Along with the increase in positive responses to the children there was a corresponding

increase in negative kinds of comments. While it is not empirically tested, the behavior of the children seems to have changed (for the better) as a function of the change in the teacher's behavior.

One problem with the above study was the cost involved in having faculty members providing the feedback. Much time is used in traveling from school to school and, since each student must be seen frequently, handling more than three or four interns at a time becomes exceedingly difficult. The present study attempted to use undergraduate students as observers and to provide the feedback.

METHOD

Subjects

Undergraduate teaching interns served as subjects in this experiment. All of these interns were enrolled in a required educational psychology course conducted by one of the authors. Some were in the second quarter and some the third quarter of a program which requires 5 quarters of interning (2 hours/day, 5 days/week). This particular group was placed in Carrollwood Elementary School in Tampa, distributed among grades two through five. Subjects were randomly divided into an experimental and a control group, such that there were nine males and two females in the experimental group and seven males and three females in the control group. Due to changes in their school assignment from Winter to Spring quarter, three experimental and two control Ss were lost, leaving a total of eight experimental and eight control Ss who completed the experiment.

Apparatus

The equipment used in this investigation consisted of a RCA portable AM-FM radio which was worn around the waist by each S. The radio's earphone was placed in the student's right ear. His observer used a Realistic-Apollo FM-90 wireless microphone to provide the S with feedback.

Teacher Behaviors

Six categories of teacher (intern) behavior were recorded by the observers. The first category, "Verbal Praise", included any comment made by the intern in response to a desirable behavior on the part of the students. For example, such remarks as "good" were included in this category. The second category, "Physical Contact", simply referred to the contingent use of an affectionate "pat on the head" of a student by the intern. The next class of behavior, "Contingency Contracts", consisted of the explicit statement by the intern of a reward for good behavior. Statements by the interns such as, "You may have free time upon the completion of this assignment" were counted as contingency contracts. Whenever the reward promised in the contract (such as the one above) was delivered, this was marked as an occurrence of a behavior in category four ("Contract Carried Out".) A category called "Others" was used as catch-all for rewarding students in any way other than those listed above, such as writing student's name on the board, displaying his work, etc. Last, the number of times that an intern punished students, by scolding or threatening and/or removal of privileges, was recorded ("Punishment").

Procedure

Five student assistants were employed as observers in the school. These persons underwent five weeks of training in the identification and recording of the behaviors, outlined in the section above, and in the use of the equipment.

The experiment consisted of three phases, Baseline, Training I, and Training II. Baseline consisted of seven 20-minute observations for each intern. The interns were required to wear the radios as they went about their teaching activities. The observer sat in the back of the room and recorded the teacher behaviors identified above. Training I also involved seven observations on each student teacher. This phase of the investigation differed from Baseline in that anytime an Experimental S emitted a behavior from any of the first five categories ("Verbal Praise", "Physical Contact", Contingency Contracts", "Contract Carried Out" and "Other") he received feedback through the earphones in the form of "good" from the observer. The control Ss continued to wear the earphones while they were observed but received no feedback through them. Before Training II began, all Ss were briefed as a group about the purpose of the experiment and told what the categories of behavior being observed were. Subsequently seven observations were made on each subject in Training II. It should be noted here that the interns were not in the school for a two week period between Training I and Training II. Upon their return to the school, each intern was assigned to a new class.

Observer/intern effects were avoided by insuring that each observer make approximately the same number of observations on each S. The identification of Ss as experimental or control was unknown to any of the school personnel or to the professor co-author. Each rater's schedule allowed for three free observation periods per week to be used for the purpose of doing reliability checks on the other observers.

RESULTS

Figure I shows the mean frequency of all five types of positive teacher behaviors averaged for the two groups over each of the days of the three phases of the experiment. The Experimental and the Control groups did not differ significantly from each other in the first phase (baseline period) of the experiment ($t = .49$, $df = 14$). As can be seen in Figure I, the frequency of positive behaviors during Phase II increased in the Experimental group while those of the Control group remained relatively stable. Analysis of variance showed that the main effect of conditions was significant ($p < .05$, $F = 2.41$, df 1, 14) but that there was no significant effect of trials or interaction of trials and conditions.

There were no significant effects in the third phase of the experiment although it can be seen in the graph that at the end of this period the two groups were diverging.

(Insert Figure I here)

In looking at the data of each of the positive behaviors separately, it became apparent that most of the differences between the Experimental and

Control groups shown in Figure I came from the differences in the frequency of positive verbal responses. Figure II depicts the mean frequency of only the positive verbal responses for each group over the three phases of the study. Again, the mean difference between the Experimental and the Control groups was not significant ($t = .59$, $df = 14$) in the first phase before the treatment of feedback began. However, the main effects of conditioning of trials, and of the interaction of trials with conditions were all significant ($p < ?$, $F = 3.74$, $df\ 1, 14$; $p < .01$, $F = 1.61$, $df\ 6, 84$; $p < .005$, $F = 18.24$, $df\ 6, 84$, respectively). In Phase III, none of these effects were significant.

(Insert Figure II here)

When the four positive behaviors exclusive of the verbal were combined, there were no apparent differences between them (see Figure III. Analysis o variance confirms this since there are no significant effects. In general, the occurrence of these types of behaviors is very low (never more than an average of 1.40/20 min. session and sometimes never). This in itself is an interesting finding. The lowest frequency of occurrence of verbal praise was an average three/session. None of the analyses done on the three phases yielded any significant findings.

(Insert Figure III here)

Figures IV - VII show the frequency of occurrence of "Physical Contact", "Contingency Contracts", "Contract Carried Out" and "Other" for both groups. Analyses of variance confirmed the visual impression of no differences either between or within groups for any of the variables.

(Insert Figures IV - VII here)

The frequency with which punishment behaviors (of any sort) by the student teachers was emitted was shown in Figure IV. Although these behaviors did not lead to any feedback from the advisers, they were recorded along with the positive categories of behavior. The two groups did not differ significantly in the rate of these behaviors during the first phase ($t = 1.16$, $df\ 14$). The two groups separated quickly and remained apart for the whole of phase two. Thus, neither trials nor the interaction of conditions by trials was significant. The differences between the groups disappeared in the final phase of the experiment as the number of punishments diminished for both.

(Insert Figure VIII here)

Summary and Recommendations

The purpose of this study was to modify certain aspects of the classroom performance of teaching interns through the use of immediate positive feedback. With respect to one type of behavior, positive verbal responses, this goal was successfully met during the first training session. (Phase II). The experimental group emitted significantly more positive verbal comments to their pupils than did the control group, a difference which increased significantly over training trials. This interaction between trials and groups would be expected to be significant in any situation where learning took place in the experimental, but not the control group, thus leading to the typical learning curve depicted in Figure II. The difference between the groups disappeared at the beginning of Phase III, and, although the two groups were diverging during the end of Phase III, the two groups never differed significantly from each other again.

Several factors were operating which may have disrupted the effects of the training from the second to the third phase of the experiment. First, there was a time lapse of thirteen days between these two phases corresponding with the "break" between the winter and spring quarters. This was both unfortunate and unavoidable. At first, it may appear that the learning which took place was very tenuous since "forgetting" seemed to occur so readily with the passage of time. However, another, probably more critical, condition occurred upon the return of the student interns to the elementary school in the spring quarter. That is, the interns were assigned to work with different teachers, at different grade levels and with different children. Typically, the interns were asked, or forced, to assume a more passive role. For example, many were required to "sit out" and simply observe during the first weeks of the new quarter. Naturally, this greatly reduced any sort of interaction of the interns, positive or negative, with the children so that our data may not be a true reflection of the retention of the earlier learning.

At the beginning of the spring quarter, prior to the students' return to the elementary school, one of the Es went to a regularly held seminar class on the USF campus. The purpose of this visit was to describe to the Ss the categories of their behavior which were being recorded by the Cs. Originally the Ss had only been told that they would be observed, some records made, and that they may or may not hear something through the earphones. Here we were interested in whether or not informing Ss as to which aspects of their behaviors were of interest to the E would influence the frequency of occurrence of these behaviors. Since the project had as its goal the discovery of an effective and inexpensive way to modify intern behavior, it was important to establish that simply instructing interns in the university classroom regarding how they should perform in the elementary school would not produce the desired results. Examination of Figure II will show that, if anything, these instructions may have served to inhibit the use of positive verbal responses. Certainly, it did not facilitate it in either group. This finding is in keeping with the results of Heinlein (19__) who found that learning effects in Ruman Ss disappeared when the Ss were told what the experiment was all about. One other piece of information should be mentioned here, and that is that approximately half of our Ss were given fairly extensive instruction during the winter quarter in their course EDF 305 on the basic concepts of behavior modification through the use of protocol materials. Again, the transfer of successfully learned cognitive responses to the real-life situation of teaching elementary school children did not

seem to take place. This hardly comes as a surprise to any educator or, for that matter, any psychologist. Evidently, learning to reward children for their good behavior occurs only by doing so and, then only by doing followed by immediate feedback that you "did".

The frequency of the categories of positive behavior other than verbal praise did not appreciably change during the experiment from their operant rate at the beginning which was close to zero. These data would suggest the unfortunate fact that these behaviors rarely occur naturally in the classroom. Thus, teacher-trainers will likely be required to shape these behaviors through successive approximation. Given the use of apparatus such as was employed here, it might be feasible simply to tell the interns to touch the child, offer him a contract, fulfill the contract, etc., at an appropriate point and, then, following the intern's compliance with the suggestion, the trainer would deliver positive feedback. How effective a short-cut to more standard, non verbal shaping techniques this latter method would provide would have to be empirically determined.

The number of times a punisher was delivered was counted, although there was no feedback delivered contingent upon its delivery. It is interesting to note that the experimental Ss who were given praise when they emitted rewarding behaviors emitted fewer punishing behaviors than did the controls. Apparently, the increase in the frequency of rewards teachers give is associated with a decrease in the frequency of punishments. If the two types of teacher behaviors are mutually incompatible, as this finding suggests, this would be important to know for pedagogical reasons. Such a hypothesis should be subjected to careful further study.

Several improvements over the present methods should be recommended to any who might wish to use it. First, the apparatus was poor and thus, the quality of the signal left much to be desired. In addition, there was "drift" so that Ss would suddenly hear music or noise which was very distracting when they were trying to teach. Another methodological shortcoming had to do with the fact that the Os in this study were limited to the feedback response of "Good." However, if the transmission system were improved, the amount and range of feedback could be increased from single words to paragraphs depending on the situation.

One extension of this basic procedure which is planned here with the aforementioned improvements is to use interns to shape and be shaped by other interns, such that performance in either situation yields course credit, and to some extent, a grade. Certainly the use of feedback associated with more powerful rewards such as grades or points for time off would be more likely to change teacher behaviors. In the present study, we know that interns were continually annoyed by the apparatus and by the associated necessary hearing loss and were uncomfortable in the observational situation. What must really be emphasized here is that, despite their discomfort, the verbal behavior of the experimental groups was significantly influenced just by the act of fellow students simply commenting a (sometimes garbled) "good" contingently. This feedback was delivered to young interns in the context of trying to teach heterogeneous groups of 30 children with a regular teacher "looking over their shoulders" and sometimes with a principal, supervising professor or parent observing them also. This is remarkable.

This study combi[illegible] with the earlier one by the same authors provide evidence that this [illegible]od of delivering feedback works in the real-life setting of a classro[illegible] Ways of strengthening its effectiveness and making it produce more per[illegible]t changes in the learner remain to be developed. A variety of target [illegible]iors emitted by various target groups could be modified using this [illegible]ach.

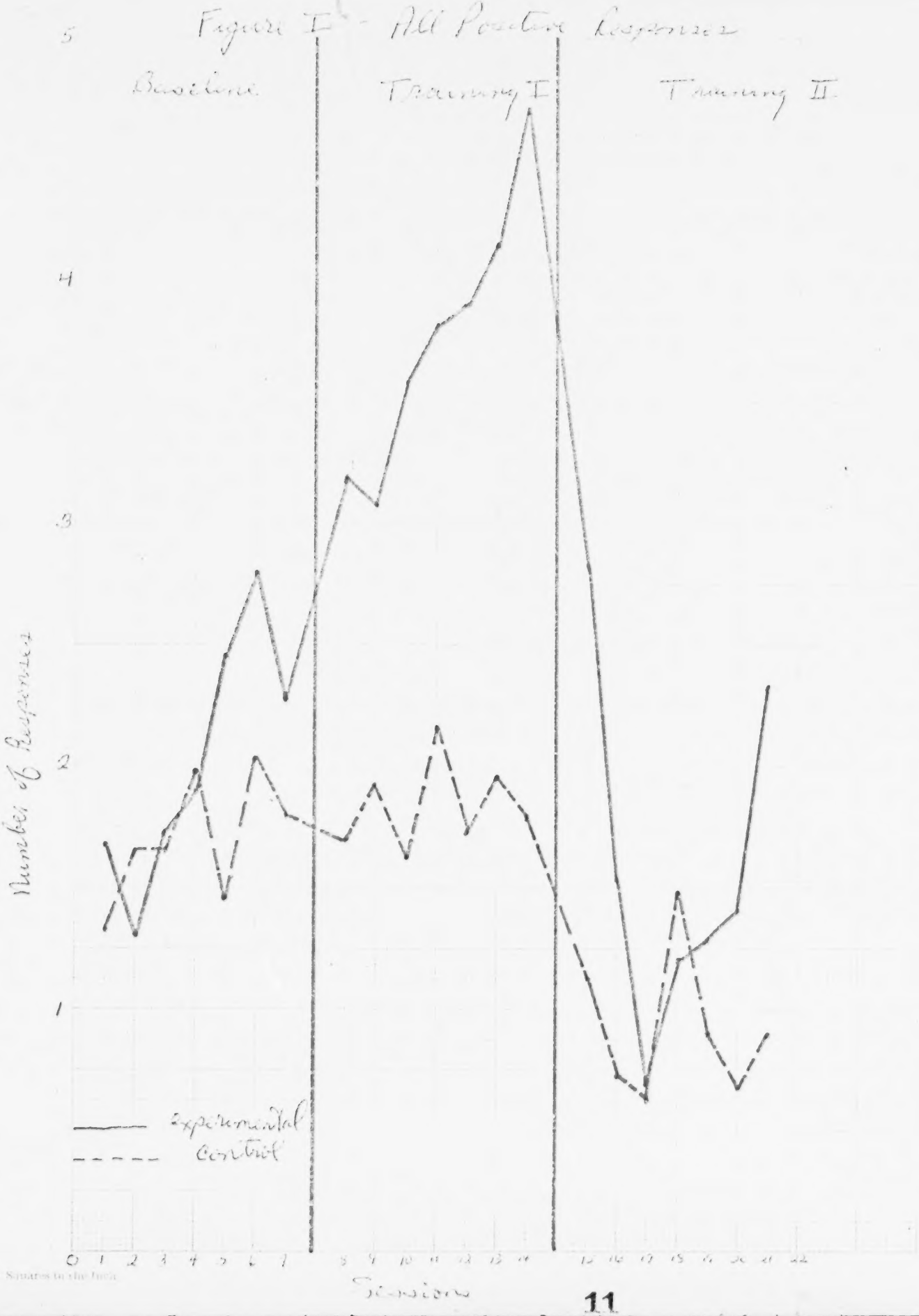
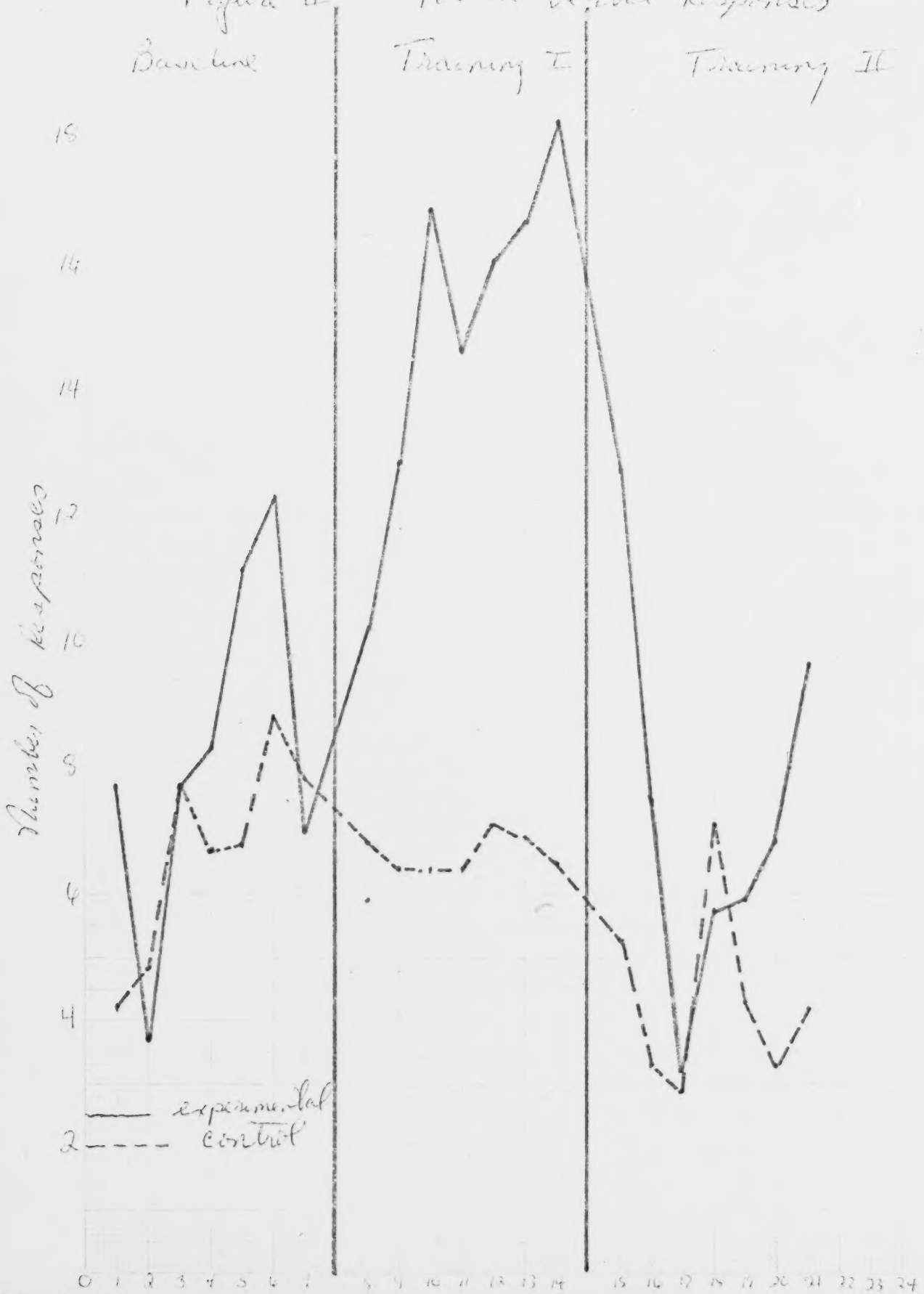


Figure I - All Positive Responses
Baseline
Training I
Training II
5
4
3
2
1
Number of Responses
Experimental
Control
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22
Sessions

Figure II - Pointer Verbal Responses



20 Sessions to the left

Figure III - Positive Responses - Excluding Verbal

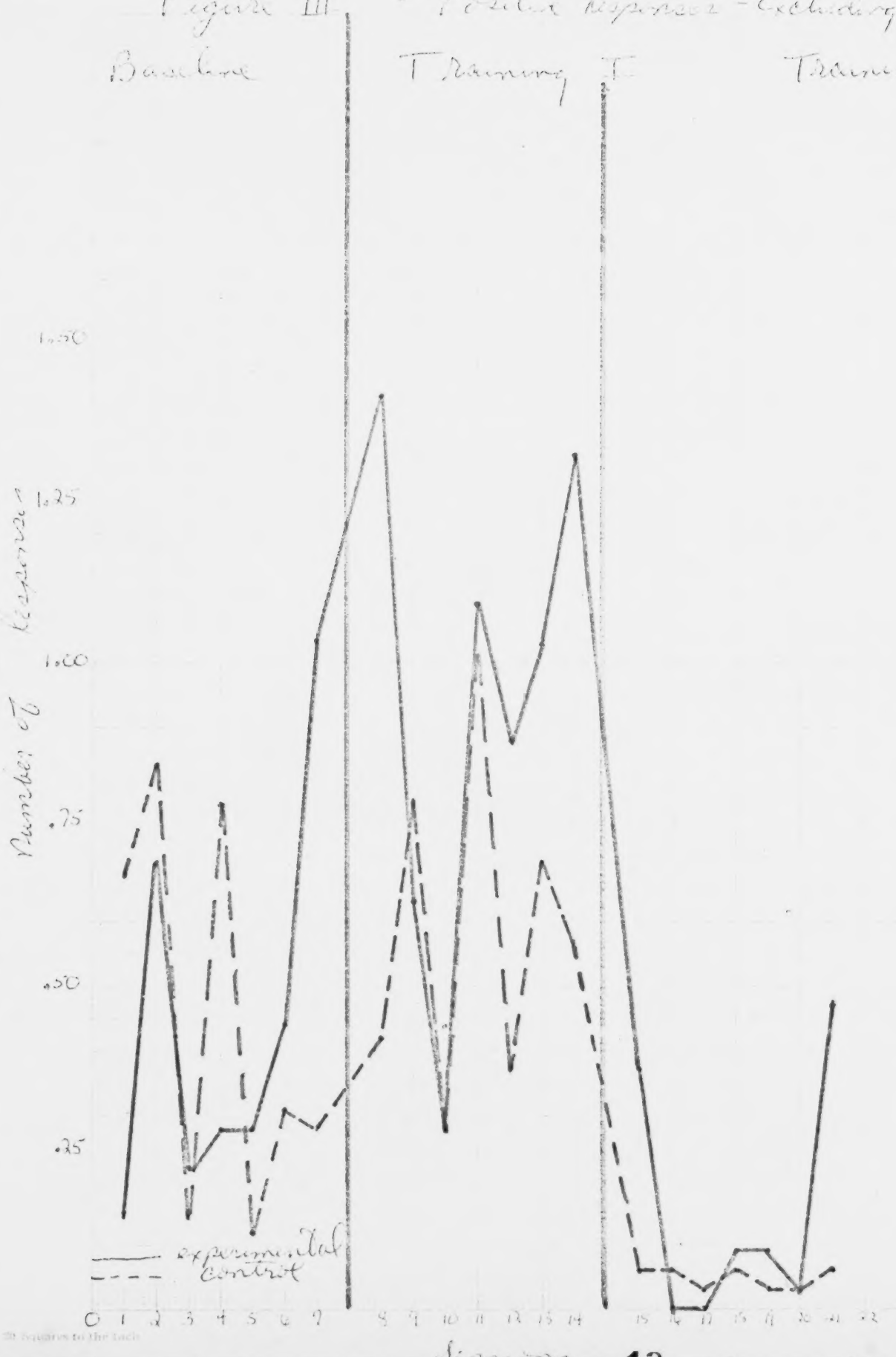


Figure IV - Physical Contact

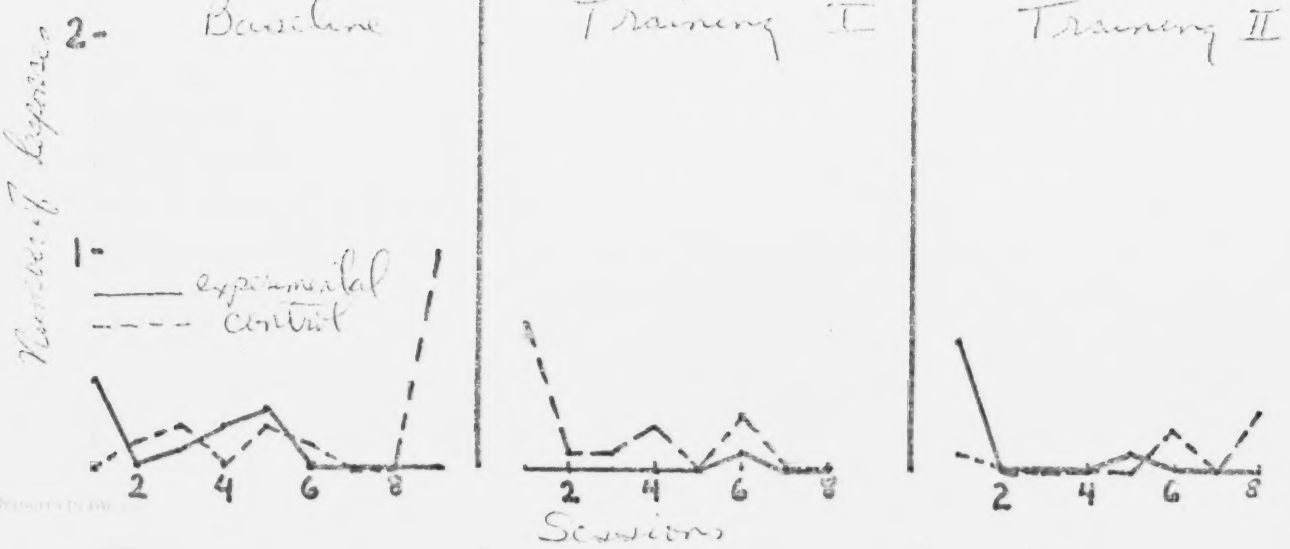


Figure V Contingency Contracts

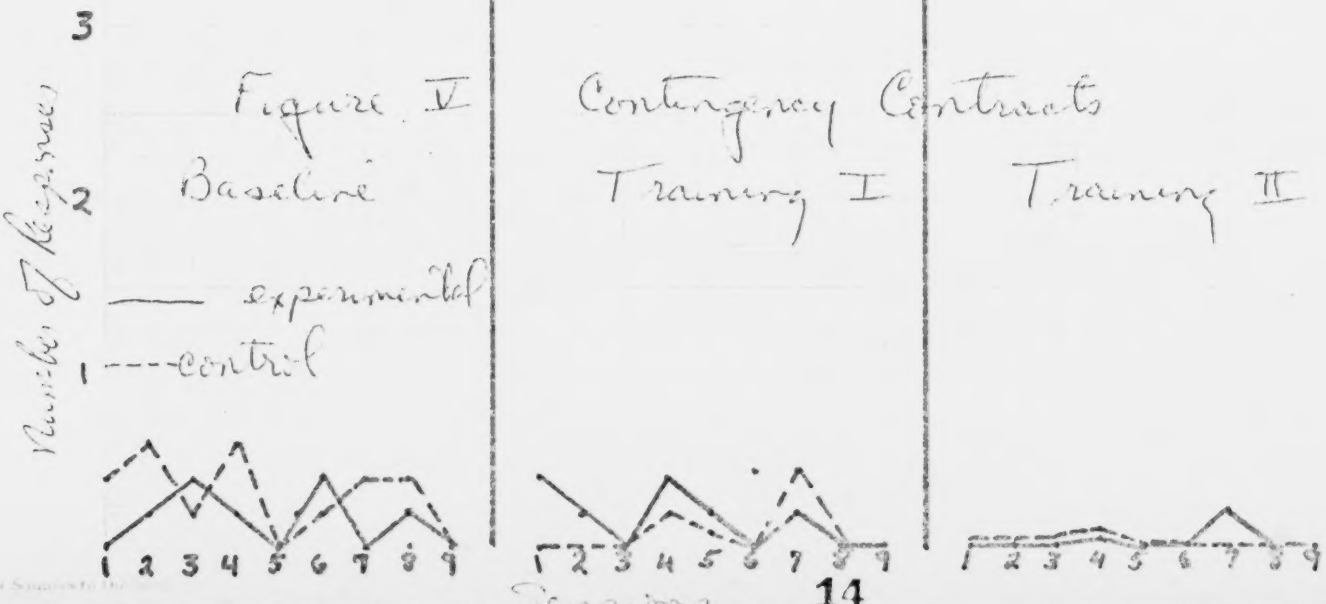
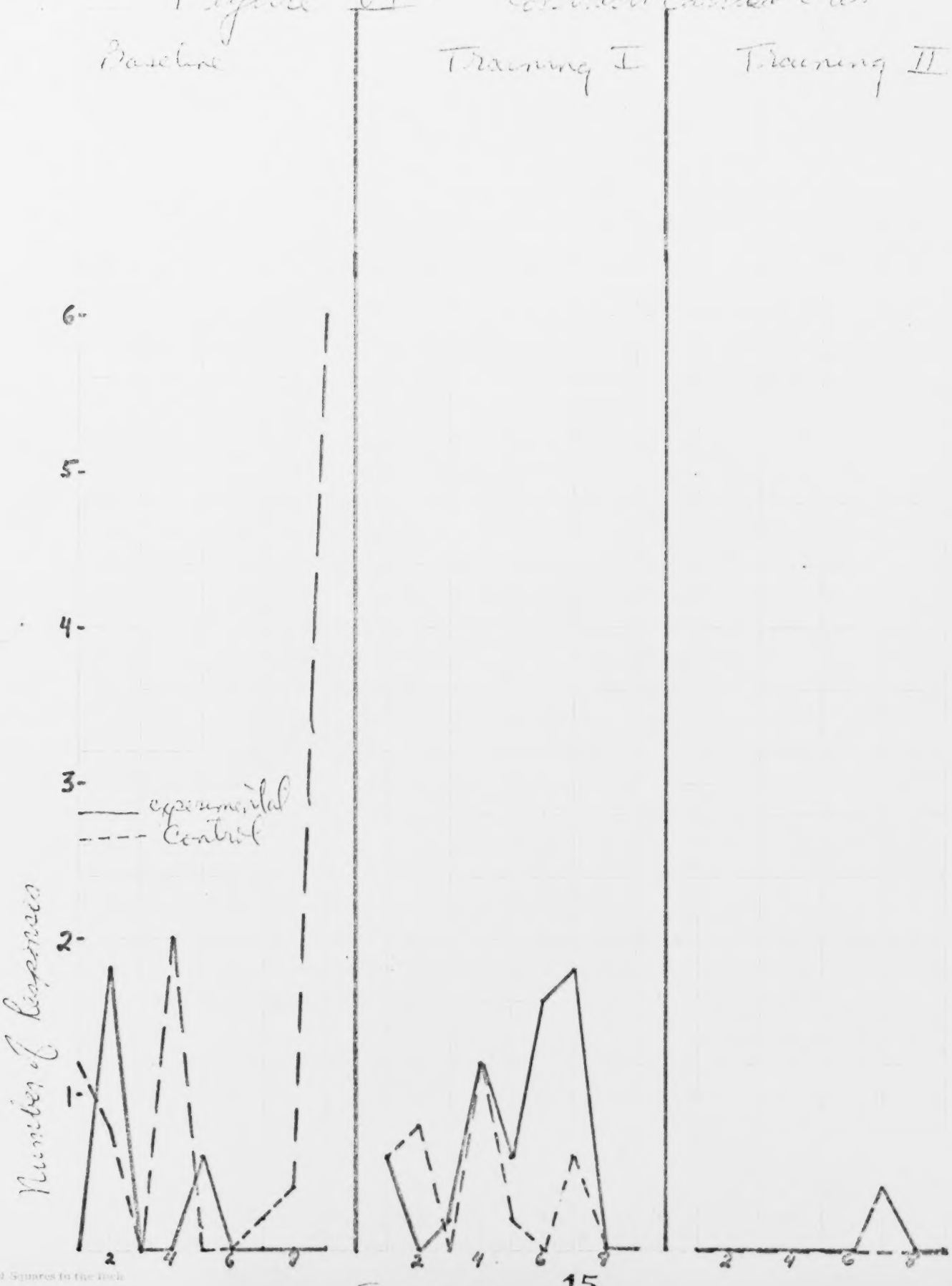


Figure II - Contrasts Carried Out



20 Squares to the Inch

Figure III - Other

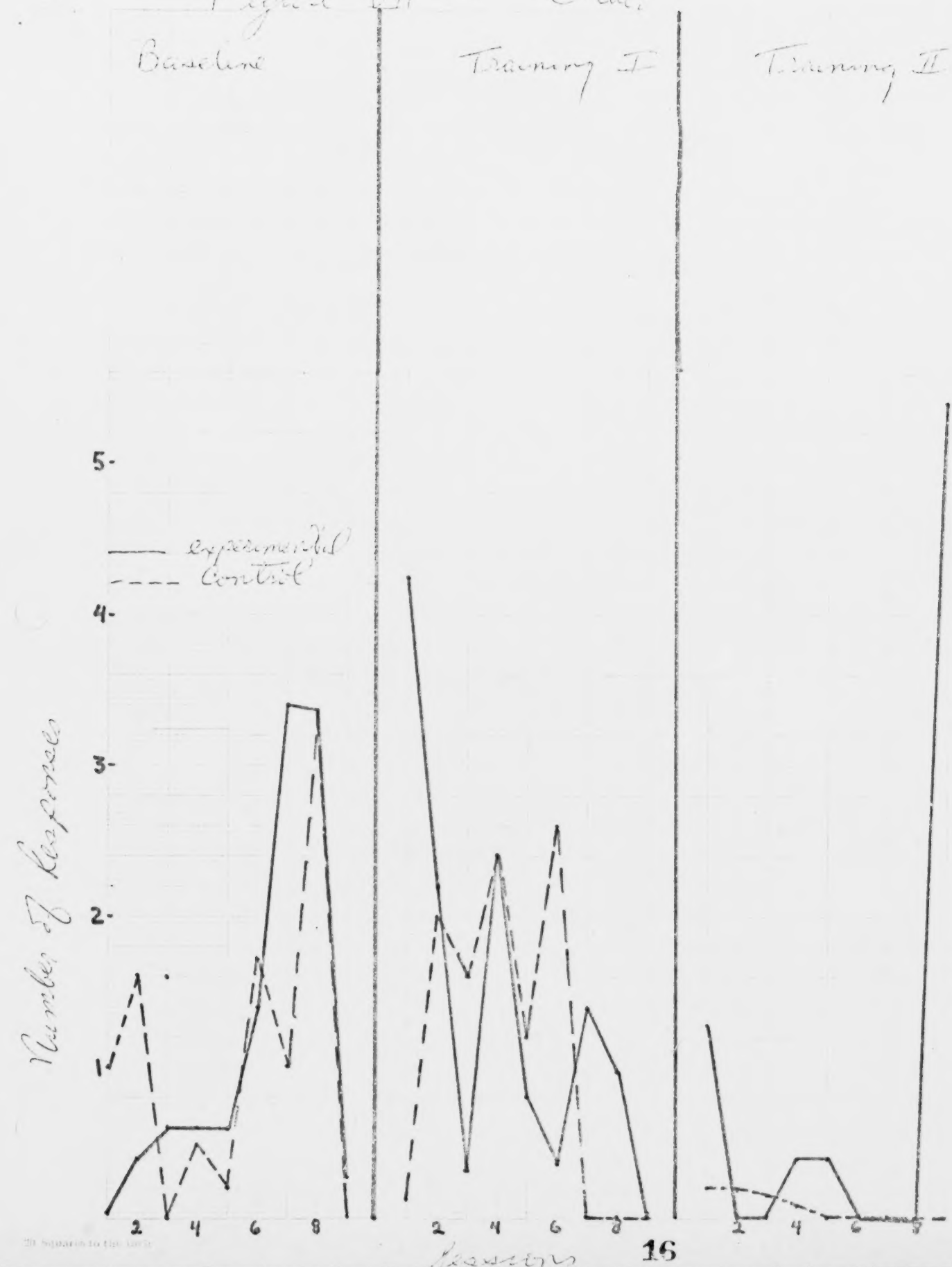
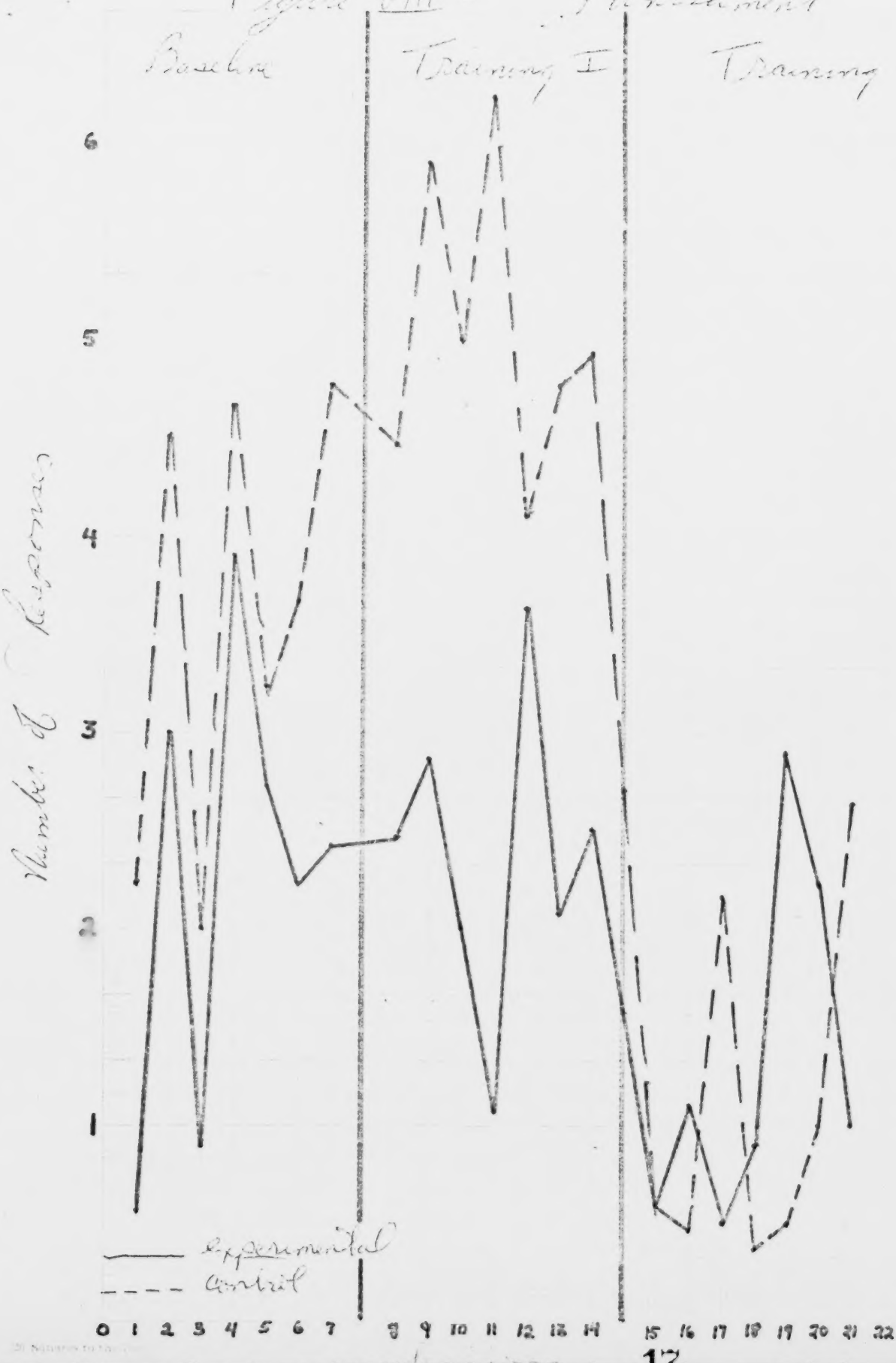


Figure VIII - Screenshot


Baseline
Training I
Training II
Number of Responses
0 1 2 3 4 5 6
1 2 3 4 5 6
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22
Experimental
Control

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